view of U.S. Patent No. 4,766,606 to Bardutz *et al.* (Bardutz) and U.S. Patent No. 6,219,387 to Wu (Wu). The Examiner rejected claims 2, 5, 6, 8, 11 and 12 under 35 U.S.C. § 103(a) over McHale, Bardutz, Wu and in further view of U.S. Patent No. 6,084,881 to Fosmark *et al.* (Fosmark). Applicants respectfully disagrees with the Examiner's § 103 rejections.

Independent claim 1 provides a system for distributing digital subscriber line (XDSL) signals to end users over a telephone wiring plant. A central office receives video signals from a video source. The central office includes a first XDSL transmission unit for transmitting the received video signals on twisted pair copper cable along with other telephony and digital data signals and for receiving data signals from end users. At least one end user location has a second XDSL transmission unit for receiving video signals from twisted pair copper cable and for transmitting data signals to the central office. A regenerator is connected to twisted pair copper cable and located a predetermined distance from the central office. The regenerator includes a receiver for receiving XDSL signals transmitted on twisted pair copper cable from either the central office or the end user. A decoder decodes the payload of a received XDSL signal into base data. An encoder repackages and encodes the base data into a desired protocol format. A line driver retransmits the encoded signal onto the twisted pair copper cable for distribution to an original destination. The predetermined distance for the location of the regenerator corresponds to a point on the twisted pair cable where the signal-to-noise ratio of a transmitted XDSL signal reaches a threshold of minimum acceptable signal quality. Claims 2-6 depend from claim 1.

Independent claim 7 provides a method for distributing digital subscriber line (XDSL) signals to end users over a telephone wiring plant. Video signals from a video source are received at a central office. The received video signals are transmitted on a twisted pair copper cable along with other telephony and digital data signals as an XDSL type signal to a terminal located at an end user site. Data signals are received on the twisted pair copper cable at the central office from an end user terminal. A signal regenerator unit is coupled to the twisted pair copper cable at a distance from the central office corresponding to a point on the twisted pair cable where the signal-to-noise ratio of a transmitted XDSL signal reaches a threshold of minimum acceptable signal quality. Transmitted XDSL signals are received at the regenerator and decoded into base data. The base data is repackaged and encoded into an

XDSL signal having a desired protocol format. The XDSL signal is retransmitted to the end user terminal. Claims 8-12 depend from claim 7.

Independent claim 13 provides a regenerator for use in a digital subscriber line (XDSL) signal type signal distribution system. The distribution system includes a central office for transmitting video signals on a twisted pair copper cable along with other telephony and digital data signals to at least one end user location. The regenerator includes a receiver for receiving XDSL signals transmitted on the twisted pair copper cable from either the central office or the end user. A decoder decodes the payload of a received XDSL signal into base data. An encoder repackages and encodes the base data into a desired protocol format. A line driver for retransmits the encoded signal onto the twisted pair copper cable for distribution to an original destination. A predetermined distance for the location of the regenerator corresponds to a point on the twisted pair cable where the signal-to-noise ratio of a transmitted XDSL signal reaches a threshold of minimum acceptable signal quality. Claim 14 depends from claim 13.

The Examiner has rejected independent claims 1, 7 and 13 as being obvious based on McHale, Bardutz and Wu. According to M.P.E.P. § 2142, three criteria must be met for the Examiner to establish a *prima facie* case of obviousness. First, there must be some suggestion or motivation, either in McHale, Bardutz, Wu or in knowledge generally available to one of ordinary skill in the art, to modify McHale. Second, there must be a reasonable expectation that this modification will succeed. Finally, either McHale, Bardutz or Wu must teach or suggest all claim limitations.

Without addressing any motivation to combine, no combination of McHale, Bardutz and Wu teach each of Applicants' claim limitations. In addition, there is no reasonable expectation that the Examiner's combination of Bardutz into McHale or Wu will succeed.

The Examiner suggests that McHale teaches the basic structure of a central office with XDSL capabilities communicating with end users. The Examiner admits that "McHale does not disclose a regenerator which disposes between the central office and the end user." (Pp. 3-4.) To make up for this flaw, the Examiner first provides Wu, as follows:

> In the same field of endeavor, Wu discloses a repeater which disposes between the central office and the end user for boosting the signal if the distance between the central office and end user

> is greater than a predetermined distance (See Fig 1 and col. 4, lines 25-60) ...

The Examiner is misstating whatever is disclosed in Wu.

Wu's Figure 1 is a block diagram showing an Internet service provider (ISP), central office (CO) and user environment (H). No regenerator or repeater of any kind is shown. The only mention of anything similar to Applicants' regenerator in the passage cited by the Examiner is at column 4, lines 55-60, as follows (emphasis added):

> Alternatively, if user environment H is more than this specified distance [18,000 feet] from central office CO, one or more signal repeaters (not shown) may be included within twisted pair wire facility TWP to *boost the signals* along their respective paths, particularly from central office CO to user environment H.

First, this does not teach *anything* about how to make *any* repeater. Second, there is no reason to believe that the repeater suggested by Wu does anything more than simply amplify or "boost the signal." This is not Applicants' regenerator, which provides for receiving a signal, decoding the signal, repackaging and encoding into a desired protocol format, and sending the encoded signal. In fact, the suggestion to "boost the signal" teaches away from Applicants' regenerator.

In addition, Wu neither teaches nor suggests locating a regenerator at a point on the twisted pair cable where the signal-to-noise ratio of a transmitted XDSL signal reaches a threshold of minimum acceptable signal quality.

In response to this argument, the Examiner asserts the following at page 6:

> [T]he applicant states that Wu does not disclose a repeater being located at a point on the twisted pair cable where the signal to noise ratio of transmitted XDSL signal reaches a threshold of minimum acceptable signal quality. In reply, it is implicitly disclosed in Wu's reference because the distance between the central office and end user site has a limit such [*sic*] 18000 feet wherein the signal will be degraded, such as Signal to Noise ratio reaches a threshold of minimum acceptable signal quality, if the signal pass the limitation. Therefore, if a service provider would like to transmit a XDSL signal to a subscriber having a distance above 18000 feet, the service provider must place a repeater between the central office and the end user site.

The Examiner appears to be saying that, since Wu discloses an approximate limit for transmitting ADSL or MDSL signals, Wu *inherently* discloses Applicants' regenerator "located a predetermined distance from the central office . . . the predetermined distance for the location of the repeater corresponds to a point on the twisted pair cable where the signal-to-noise ratio of a transmitted XDSL signal reaches a threshold of minimum acceptable signal quality." At best, Wu implies locating a repeater at a distance of 18,000 feet from the central office, a value not based in any manner on a signal-to-noise threshold but on the absolute failure of the system to operate at a greater distance. In view of the dearth of disclosure regarding Wu's repeater, the Examiner appears to be stating that since Wu suggests some use of a repeater, Wu implies that the repeater can be located in any manner whatsoever.

The last reference proposed by the Examiner is Bardutz. The Examiner's assertion regarding the disclosure in Bardutz is at page 4, reproduced as follows:

> Bardutz discloses (Col 2, lines 45 to col. 4, lines 14) a repeater "regenerator" (Fig 1, Ref Rep 1) which disposes between the central office (Fig 1, Ref office terminal), includes a receiver for receiving a signal (col. 2, lines 51, coupling means), a decoder (col. 2, lines 55-60, data recovery means) for decoding the payload of a received signal into a base data, a encoder (Col. 2, lines 60-65) for encoding and repacking the base data into a desired protocol format and a line driver (Col. 2, lines 52-53, the regenerated signals is recoupled to the line) for retransmitting the encoded signals to the end user wherein the repeater is disposed at a predetermined distance where the SNR of the signal is reached to a threshold of minimum acceptable signal quality (it is implicitly).

Once again, the Examiner is misstating the reference.

Bardutz discloses a signal repeater that is part of a system which "provides four voice channels over a single pair telephone line." (Col. 5, ll. 54-55.) The repeater is described in column 6, lines 3-6, as follows:

> The repeater of the present invention is used to regenerate digital pulses sent over the single pair telephone line which interconnects the central office and subscriber terminals.

Thus, it is clear the Bardutz's repeater works on base band data and not modulated data such as XDSL signals. Further evidence is provided at column 7, lines 8-48. Bardutz discloses converting analog voice signals from four sources into pulse signals, compressing the pulse

signals and interleaving, or time-division multiplexing, these signals for transmission over a single line. In contrast, as is well known in the art, XDSL signals use frequency-division multiplexing, or frequency modulation. This shifts the XDSL signals in the frequency spectrum allowing the XDSL signals and baseband voice signals to be transmitted *simultaneously* over the same line. Hence the need for a receiver in Applicants' system to demodulate or frequency shift the XDSL signals back to base band before these signals can be decoded to obtain the base data. Once this is understood, it becomes clear that Bardutz's repeater cannot function as Applicants' regenerator. Now, to address the Examiner's specific arguments.

The Examiner states "Bardutz discloses (Col 2, lines 45 to col. 4, lines 14) a repeater "regenerator" (Fig 1, Ref Rep 1) which disposes between the central office (Fig 1, Ref office terminal), *includes a receiver for receiving a signal* (col. 2, lines 51, coupling means) . . ." (Emphasis added.) There is no indication that Bardutz's "coupling means" is Applicants' XDSL receiver. As illustrated in Figure 3a, "an electronic circuit schematic diagram of the line coupling sub-section of the repeater transmitter subsection," Bardutz's coupling means is a transformer, which will not work as an XDSL receiver *or as a receiver for any other type of frequency modulated signal*. In response to this argument, the Examiner indicated that McHale disclosed the use of a transformer in an XDSL system. This may be true, but that is not what Applicants argue. Applicants do not argue that a transformer cannot be used in an XDSL system, but rather that such a transformer is not an XDSL receiver. A transformer cannot frequency shift or demodulate an XDSL signal, or any other kind of frequency modulated signal for that matter[1].

Applicants point out that the Examiner's own construction requires Bardutz to disclose an XDSL receiver. Thus, in arguing that no such receiver is taught or suggested by Bardutz, Applicants are not "attacking references individually where the rejections are based on combinations of references" as suggested by the Examiner.

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[1]If the Examiner believes otherwise, the Examiner is invited to connect an antenna to one side of a transformer and a set of headphones to the other. The airwaves are filled with frequency modulated signals, none of which will be reduced to audible form by the transformer.

The Examiner also asserts that Bardutz discloses "a encoder (Col. 2, lines 60-65) for encoding and repacking [*sic*] the base data into a desired protocol format." The section cited by the Examiner is reproduced as follows:

> The repeater comprises . . . data conversion means for re-encoding the regenerated signals for recoupling thereof onto the line; and, signal processing means for controlling the operation of the signal coupling means, the clock recovery means, the data recovery means and the data conversion means.

Applicants' repackaging is described on page 7, lines 16-27, as follows:

> Referring now to Figure 2, a flowchart illustrates the overall operation of the regeneration unit 32. As denoted at block 100, XDSL signals transmitted from either XTU_{co} 18 or XTU_{cust} are received by receivers 34 or 42. The received signal payload is subsequently decoded into a base data level at block 102, and temporarily stored in the appropriate buffer at block 104. At block 106, a decision is made as to whether the destination of the signal requires ATM layer processing. If so, the payload base data is retrieved from the buffer and reframed or repackaged with the appropriate ATM framing including the necessary loop timing at block 108. If ATM layer processing required, the payload base data is retrieved from the buffer and packaged for direct retransmission at block 110.
>
> As denoted at block 112, once the payload has been repackaged, the signal is encoded for transmission.

Repackaging, according to the preferred embodiment, is ATM framing with appropriate loop timing. This is a separate and distinct operation from encoding. While Bardutz may suggest some form of encoding, Bardutz neither teaches nor suggests any kind of repackaging. This is probably because there is no need to perform such repackaging in Bardutz's simple time-division multiplexed system. Once again, the Examiner's own construction requires Bardutz to disclose such repackaging and in arguing that the Examiner's own construction fails to do so Applicants are not "attacking references individually where the rejections are based on combinations of references."

Finally, the Examiner states "the repeater is disposed at a predetermined distance where the SNR of the signal is reached to a threshold of minimum acceptable signal quality (it is implicitly)." There is no such implicit teaching in Bardutz. Bardutz describes where repeaters may be located in column 6, lines 8-18, as follows:

> The repeater housings are normally mounted on telephone poles or pedestals co-located with an existing loading coil location along the cable route.
> * * * *
> Repeaters are normally required every 32 to 37 db. of line loss, which translates into approximately 3.5 miles if 19 gauge wire is used, 3.0 miles if 22 gauge is used and 2.5 miles if 24 gauge wire is used.

Thus, Bardutz discloses locating repeaters based on at least one of two conditions: where loading coils are located on telephone poles or pedestals and where a certain amount of signal loss is obtained. Neither of these teach or suggest locating regenerators based on a signal-to-noise threshold.

In addition to failing to find a teaching of each of Applicants' claim elements, there is no reason to believe that the Examiner's proposed construction will succeed. The Examiner proposes to inserting Bardutz's telephonic repeater into either McHale's or Wu's system to implement Applicants' invention. However, since Bardutz's repeater does not contain a receiver, there is no reason to believe that the Examiner's proposed construction will be operative.

Applicants believe the Examiner has failed to establish a *prima facie* case of obviousness with regards to independent claims 1, 7 and 13. Since each remaining claim depends from one of these claims, the dependent claims are also patentable.

Conclusion

Claims 1-14 are pending in this application. The case is in appropriate condition for allowance. Accordingly, such action is respectfully requested. No additional fee is believed due by filing this amendment. However, any additional fee may be charged to Deposit Account 21-0456 as specified in the Application Transmittal.

The Examiner is invited to telephone the undersigned to discuss any aspect of this case.

Respectfully submitted,

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